GRINDMASTER™

CORPORATION

Model 3511 Beverage Freezer Manual



Crathco®

Frozen Beverage Dispensers

Formerly Wilch

Grindmaster Corporation
4003 Collins Lane
Louisville, KY 40245 USA
(502) 425-4776 (800) 695-4500
FAX (502) 425-4664
www.grindmaster.com

0804 Form # WH-305-02
Part # W0600114

Table of Contents

Safety Precautions 2
Freezer Applications & Specifications .... 2 - 3
Installation .... 4 - 6
Operation and Adjustments .... 6 - 7
Care & Cleaning .... 8 - 11
Maintenance .... 11 - 13
Troubleshooting 14
Key Parts Identification 15
Assembly Diagrams .... 16 - 18
Wiring Diagrams .... 19 - 22
Refrigeration Diagram 24

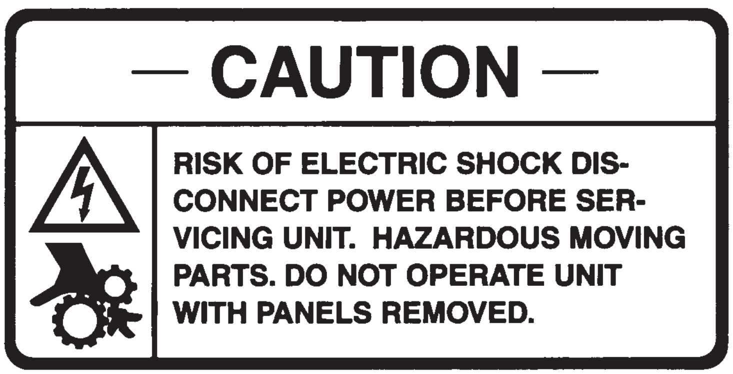
Information contained within this manual is subject to change without notice.

Contact Grindmaster Corporation's Customer/Technical Service Department at 1-800-695-4500 with any questions or for clarification.

OPERATOR'S SAFETY PRECAUTIONS

IMPORTANT: Failure to comply with the following safety precautions may result in severe personal injury or damage to the machine.

1. Read and understand the operating instructions in this manual thoroughly. Only allow properly trained persons to operate this machine.
2. Note all warning labels on the freezer. If any warning labels are missing or damaged replace them immediately.
3. Do not wear loose fitting garments or jewelry which could cause a serious accident.
4. Stay alert at all times during operation.
5. Keep operating area clean.
6. Do not attempt any repairs unless the main power supply to the freezer has been disconnected. Contact Grindmaster Technical Service for service assistance.
7. Do not put objects or fingers in the dispense plunger.
8. Do not operate freezer if any excessive noise or vibration occurs. Contact your authorized service agent.
9. Be certain machine is installed with adequate space for proper air circulation. (See installation section.) Failure to provide sufficient ventilation will reduce freezer performance and void equipment warranty.



Located on the right, left and rear panels. (part # W0600218)

FREEZER APPLICATION AND SPECIFICATIONS

Model 3511

The freezer consists of a freezing cylinder with a rotating internal auger (dasher) that is belt-driven by an electric motor. The auger scrapes frozen product off of the inside of the refrigerated cylinder. A torque sensing mechanism controls compressor operation to maintain desired product consistency. The freezer utilizes an air-cooled refrigeration system to freeze the product. A self-closing dispensing valve is attached to the front of the freezing cylinder. The unit has an adjustable consistency control and an out of product indicator.

When properly operated and cared for, the Model 3511 will provide many years of service. Proper care includes regular cleaning and maintenance. To minimize the amount of maintenance necessary, follow the operating procedures outlined in this manual.

Product Tips

The Model 3511 was designed to dispense a wide variety of frozen beverages including frozen fruit juice, frozen lemonade, slush and frozen cocktails. These products can be served in consistencies ranging from thin to fairly thick.

Two types of dispensing valve plungers and product consistency springs are available depending on the thickness of the product being served. These parts are interchangeable depending upon your needs. One plunger, part W0480438 has one horizontal outlet slot and is used to serve thin to medium products such as frozen lemonade and slush. The other plunger, part W0480451 has two horizontal outlet slots and is used to serve thicker product such as neutral base frozen cocktails. A red spring, part W0631239, is used on the drive motor to adjust product consistency to serve thin to medium products. The yellow spring, part W0631238, is used for thicker product. The spring is located next to the drive motor behind the right hand side panel.

Over an extended period of time, some products, such as frozen cocktails that contain alcohol, have a tendency to separate, or stratify. Separation of product on the mix storage hopper can result in frozen product quality inconsistency. Simply keeping the product, in the mix storage hopper, stirred on a regular basis will eliminate this problem.

Product Tips (cont.)

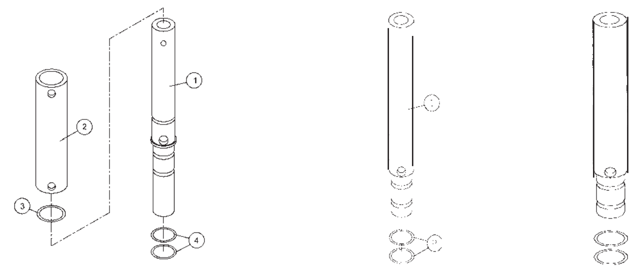
Some cappuccino or latté mixes contain dairy products which can spoil if not refrigerated. If the freezer is to be turned off at night these products must be removed from the freezer.

Contact your local health department regarding its regulations for proper mix handling and storage.

Carburetor Assembly

Your new freezer uses a metering device, known as a carburetor, to feed the proper ratio of mix and air into the freezing cylinder (and to prevent frozen product from rinsing out of the freezing cylinder).

The carburetor, or carb tube, is a tube with a hole, or series of holes, bored through the side. It is located in the hopper and fits in the hole that leads to the freezing cylinder. Air flows into the freezing cylinder through the top of the tube and mix flows in through a smaller hole in the side of the carb tube. The size of the mix inlet hole can be balanced with the viscosity (thickness) of the liquid mix and product draw rate, in such a way that the proper amount of mix is fed into the freezer cylinder to blend with air at just the right ratio. Mix viscosity varies by mix type, mix temperature and mix age. Different serving rates also demand different feed rates. For many products, the proper mix to air ratio is generally accepted to be two parts mix to one part air. This proportion yields a finished product that is both tasty and profitable. At this ratio, one gallon of liquid mix will yield a volume of one and one-half gallons of frozen product. This additional volume is the overrun in the product. Crathco offers three versions of carb tubes (see Figure A). Depending on the product being served and overrun requirements there is a standard tube for most slush or cocktail products, a low overrun carb tube that allows all air trapped in the freezing cylinder to escape and a smoothie/shake carb tube. This carb tube has an outer sleeve that can be rotated to line up with different hole sizes to provide various levels of overrun. *Most applications only require the standard carb tube.*



Thick product carb tube (W0471136) | Standard carb tube (W0471076) | Low overrun carb tube (W0472060)

Figure A

Mix Considerations - General

Freezing characteristics are affected by the amount of sweeteners and solids in the mix. The amount of sweeteners and solids is called BRIX. BRIX can be measured with an instrument called a refractometer. A BRIX reading of between 11 and 14 will provide optimum freezer operation. Mixes with this BRIX level will freeze down to a smooth, uniform consistency. Mixes with too high a BRIX level will take longer to freeze down and will yield a soft, wet frozen product. Mixes with too low a BRIX level will have larger ice crystals and will have a tendency to dispense slowly.

Alcohol content also affects product freezing characteristics. High alcohol content may prevent the freezer from serving product at proper thickness.

Note: Always take BRIX measurement using mix that has been thoroughly blended, before it is frozen. Always allow frozen mix to thaw thoroughly before taking a reading.

For maximum output capacity, always pre-chill mix before adding it to the freezer. Pre-chilled mix gives the freezer a head start on the freezing process and will speed both initial freeze down and recovery time. It is normal for output capacity to decrease when warm mix is added, or when the freezer is operated in a warm area.

Freezer Specifications

Model 3511	
Electrical	220V / 60Hz / 1 Phase Dedicated 20 Amp circuit
Drive Motor	1/2 hp, Capacitor Start
Compressor	1 hp
Cooling	Air-cooled
Actual Weight	175 lbs (79.4 kg)
Mix Hopper Capacity	5 gallons (18.9 liters)
Freezing Cylinder Capacity	1-1/2 gallons (5.7 liters)
Refrigerant	See Serial Number Plate
Refrigerant Charge	See Serial Number Plate
High Side	Approximately 275-350 psi
Low Side	35-40 psi

INSTALLATION

Shipment Transit

1. The freezer has been operated and tested at the factory. Upon arrival the complete freezer must be thoroughly checked for any damage which may have occurred in transit.

Note: *A Tip (N) Tell warning device is placed on each shipping carton at the factory. If the indicator is red, the carton has been tipped in transit. (See Figure B)*

2. **THE CARRIER IS RESPONSIBLE FOR ALL DAMAGE IN TRANSIT WHETHER VISIBLE OR CONCEALED. DO NOT PAY THE FREIGHT BILL** until the freezer has been checked for damage. Have the carrier note any visible damage on the freight bill. If concealed damage and/or shortages are found later, advise the carrier within 10 days and request inspection. The customer must place any claim for damage and/or shortage with the carrier. Grindmaster cannot make any claims against the carrier.



Figure B

Installing Your Unit

1. Place the self-sealing rubber pad (shipped with the freezer) on a level counter that is stable and strong enough to safely support the freezer's weight (200 lbs / 90.7 kg), or if equipped with legs instead of pad, install legs by screwing them into the four leg holes on the bottom of the unit. (Leg Kit Part # W0890220 (4) 4" Legs)
2. Make sure freezer is to be placed in a location that is within 6' of a properly grounded circuit and allows adequate space at each side and above for proper air circulation.
   Air Cooled Units Only: Minimum clearance is 6" (15 cm) on both sides and 0" at back and open above the freezer. (See Figure C)

NOTE: Failure to allow adequate ventilation will void the warranty and reduce freezer performance.

NOTE: Locating the unit in high ambient temperatures (over 100°F / 37.8°C) will significantly reduce the performance of your machine.

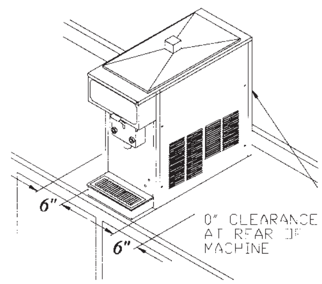


Figure C

3. Remove the side panels and supporting all four sides, lift machine up (by the frame) and place in appropriate area on top of rubber pad.

⚠ **CAUTION: If equipped with spinner do not lift unit up by spinner shaft. It will cause serious damage to spinner.**

⚠ **CAUTION: Beverage freezers are heavy pieces of equipment. It is recommended that moving or lifting the unit be done by two people to avoid injury.**

4. The side panels should still be removed. Cut the cable tie used to secure motor during shipment. Make sure motor rocks freely. (Figure D)

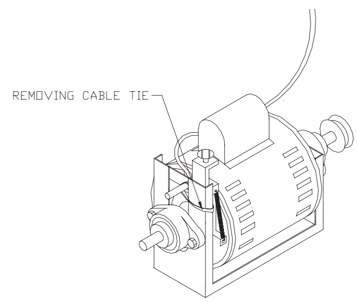


Figure D

Installing Your Unit (cont.)

7. Review hopper contents to make sure all parts are available:

Part #	Description
W0600114	Manual
W0600073	Rubber Pad Sheet
W0600121	Merchandiser Installation Sheet
W0600012	MSDS Sanitizer Sheet
W0600159	Warranty Registration Card
W0890218	Drip Tray Kit
W0520094	Hopper Cover
W0480445	Valve Handle
W0631230	Valve Spring
*	Carb Tube
*	Dispense Valve Plunger
W0470076	Lubricant
W0631903	Sanitizer Packets
W0340022	O-rings

* Optional items specified when the unit is ordered.

8. Fill out Warranty Registration Card with the requested information and mail to Grindmaster Corporation.
9. Replace side panels.
10. Assemble the dispense valve following the instructions on page 9. The valve plunger, spring and retaining pin come in the small parts bag.
11. Be sure ON-OFF-CLEAN switch (toggle switch located underneath the electrical box) is in the “OFF” position.
12. Connect the power cord directly to a properly grounded DEDICATED 220V/60Hz, 15 Amp circuit. Do not use an extension cord.

⚠ **Do not alter or deform the plug in any way! Altering or deforming the plug may damage unit and will void warranty.**

13. Remove the drip tray kit from the bubble wrap. Separate the parts and remove the protective coating. The drip tray is mounted on two screws that are located on the lower front of the freezer cabinet.
14. Place the key hole slot of the drip tray support bracket (W0471022) on to these screws and tighten the screws.
15. Angle the back of the drip tray surround bracket into the drip tray support bracket (W0471022) and lower bracket to lock it into place.
16. Place drip tray onto drip tray surround bracket.
17. Place the louvered drip tray insert into drip tray.

Accessory Installation

The Model 3511 has several optional accessories that can be added to the unit in the field to meet your application's needs. These accessories come with installation instructions.

- Spinner - Spinners are typically used in applications that add flavoring to a frozen neutral base product after it is dispensed. Allows operator to serve a wider variety of frozen drinks from one machine (i.e. hazelnut added to cappuccino). See Figure E.
- Concealed Air Filter - Prevents dust from clogging the condenser. Ideal for applications near beaches. Helps maintain maximum air flow and optimum freezer performance. See Figure F. NSF approved. Part # W0890200 stainless steel; W0890208 black.
- Exposed Air Filter - Similar to concealed air filter. Not NSF approved. Part # W0890206. See Figure G.
- Valve Lock Security Bracket - Part # W0471135. Ideal for self-service locations to prevent unauthorized use. Lock must be purchased separately. See Figure H.
- Remote Fill Control - Automatically refill the mix storage hopper. Provide additional labor savings by pre-mixing product automatically and monitoring system to maintain the mix hopper level.
- Private Label Header - A private label or different drink header can be installed by removing two screws from the electrical box cover. Place the header (transparency) between the clear and opaque plates (plastic lens). Put these in place under the lip of the machine top. Slip the electrical box cover back on to the machine and reinsert the screws. (See Figure I) Grindmaster offers a variety of drink headers including: frozen beverage, frozen lemonade, cappuccino, margarita, pina colada, frozen cocktail, frozen daiquiri and smoothie.

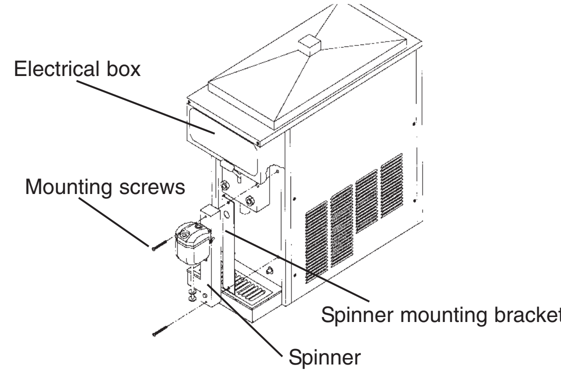


Figure E

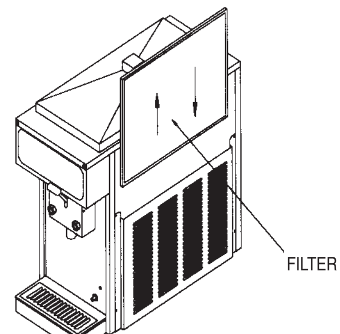


Figure F

SLIDE THE FILTER IN BEHIND THE FILTER PANEL, & IN FRONT OF THE EXISTING SIDE PANEL. TO CHANGE, REMOVE, CLEAN AND/OR REPLACE.

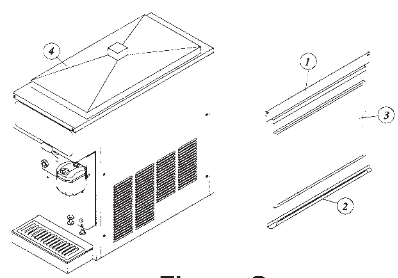


Figure G

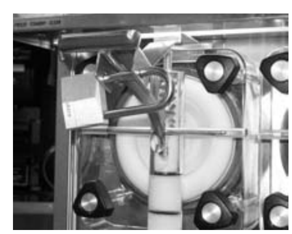


Figure H

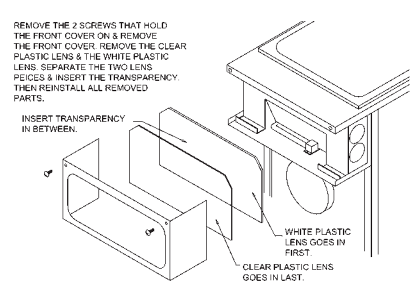


Figure I

OPERATION AND ADJUSTMENTS

How to Operate

1. Sanitize unit following the cleaning instructions starting on page 10.
2. Fill the mix storage hopper following the instructions on page 10. Allow barrel to fill with product to proper level, then insert carb tube from parts bag in hole toward rear of hopper. See Figure J.
3. Turn power switch to "ON" position.
4. Allow product to freeze in barrel. Compressor will turn off when product reaches pre-set consistency.
5. To dispense product pull down valve handle and release when done.
6. If product consistency is not as desired, adjust per the instructions on page 7.
7. Refill mix storage hopper when "mix out" light is ON.
8. Clean the unit regularly following local health codes.
9. Perform maintenance when necessary to increase the life of the unit. See chart in this manual for regular maintenance schedule.

Mix Low Function

1. This model utilizes a simple float mechanism to sense when mix is low in hopper. (See Figure J) When the mix level in the hopper is low, the mix low light located in the front of the machine next to the valve block will illuminate.

NOTE: Do not run the unit under mix low conditions for long periods of time. This can affect machine performance or damage componentry.

Consistency Adjustment

From time to time, it may become necessary to readjust the consistency setting (thickness) to compensate for variation between different mixes or to switch from one type of product to another. This adjustment is made as follows:

1. ***Disconnect electrical power.***

WARNING: Do not attempt to readjust the freezer until electrical power has been disconnected.

2. Remove right side panel (facing the freezer).
3. Use the adjustment screw, situated on the front of the drive motor mounting bracket to change product thickness. Turn the thumbscrew (3 full turns for red spring, 1 turn for yellow spring) to make a noticeable change in consistency. (See Figure K)

NOTE: Clockwise is for thicker product consistency and counter clockwise is for thinner product consistency. (See Figure L)

4. Reinstall the side panel, reconnect power.
5. Turn freezer to “ON” and allow it to freeze to desired consistency.
6. Check product. Repeat process until desired consistency is achieved.

NOTE: When making changes to a colder (thicker) setting, recheck consistency again after the compressor has cycled off. When adjusting (counter-clockwise) to a thinner consistency, a large portion of product should be drawn from the dispense valve to reduce the product thickness below the new set point (adjustment). Then allow the freezer to refreeze product to the new setting.

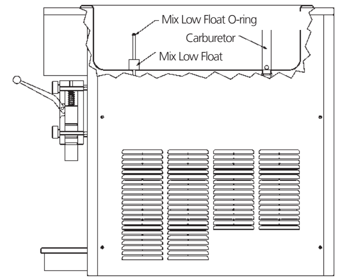


Figure J

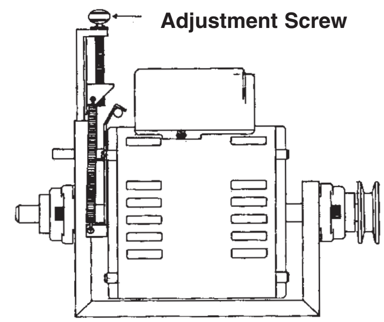


Figure K

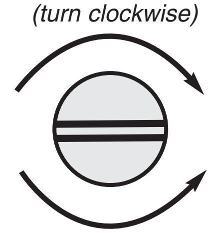


Figure L

CARE AND CLEANING

Cleaning and sanitizing frequency must be followed according to state and local health department regulations.

NOTE: Each time the freezer is fully disassembled, all foodzone freezer components must be thoroughly washed and sanitized using procedures recommended by the local health department. In lieu of local health department recommendations, use a three compartment sink; one compartment to wash parts in detergent, one compartment to rinse, and one to sanitize.

Drain and Rinse

1. If the freezer is empty, proceed to Disassembly and Cleaning. If there is product in the freezer, turn the front panel switch to "CLEAN". Most users schedule cleaning when product in the hopper is low to minimize product loss.
2. On freezers using the optional Remote Fill Control and Proportioning Pump, turn "OFF" the water valve on the Proportioning Pump, using the valve next to the inlet pressure regulator and turn the switch on the Remote Fill Control to "OFF".
3. Open the front dispensing valve and drain all product from the freezer. Close the dispensing valve and turn freezer to "OFF".

NOTE: Use approximately 2½ gallons (10 liters) of cool water to rinse product out of freezer.

4. Remove the carburetor tube and pour water into the storage hopper. Allow the water to fill the freezing cylinder.
5. Turn the panel switch to "CLEAN" for 5 minutes.
6. Open the dispensing valve and drain the water from the freezer.
7. Turn the freezer "OFF".

Disassembly and Cleaning

Note: For cleaning and sanitizing before initial start-up remove carb tube, dispense plunger, handle and spring from parts bag first.

1. Disassemble the dispensing valve assembly (Figure M). Pull out valve handle retaining pin while supporting the valve plunger from the bottom (Figure N). Push up on the valve plunger and remove the stainless handle (Figure O). Slide the valve plunger and spring downward to remove (Figure P).
2. Remove knobs and carefully remove the front dispensing valve assembly, leaving the dasher assembly in the cylinder. Remove the o-rings from the plunger assembly and back of the dispensing valve body. (See Figure Q)

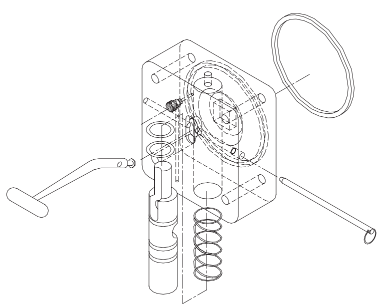


Figure M Disassemble Dispensing Valve

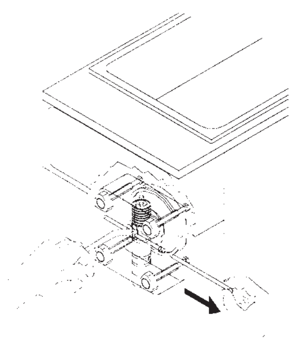


Figure N Remove Pin

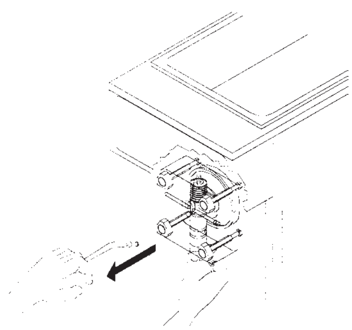


Figure O Remove Handle

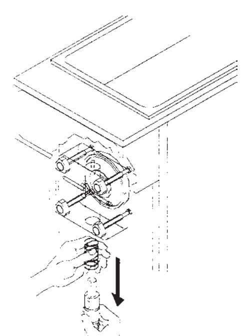


Figure P Remove Plunger and Spring

NOTE: The best way to remove an o-ring is to first wipe off all of the lubricant using a clean paper towel. Pinch the o-ring upward with a dry paper towel between your index finger and thumb. When a loop is formed in the o-ring, roll it out of the groove with your other thumb. Always remove the o-ring farthest from the end of the plunger first. Carefully inspect the o-rings and replace if necessary. (See Figure Q)

3. Remove the dasher assembly from inside the freezing cylinder taking care to avoid damaging the rear seal assembly at the back of the freezing cylinder. Disassemble the dasher assembly by removing the scraper blades, stator rod and front and rear stator rod bearings.

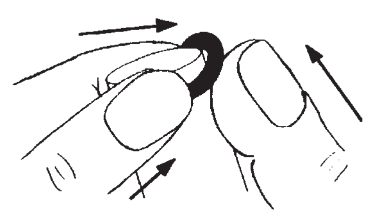


Figure Q Ring Removal

Disassembly and Cleaning (cont.)

4. Remove stationary half of the shaft seal assembly from the back end of the freezer cylinder. This is accomplished by reaching into the cylinder and pulling seal out with your index finger. (See Figure R)
5. Slide the rotary half of the seal off the dasher shaft. Inspect both seal components carefully for nicks or cracks. Replace seal if defective.

NOTE: To prevent leakage the surfaces of the rotary seal and the stationary seal must be smooth with no chips or cracks.

NOTE: All units are shipped with a standard ceramic seal (Part # W0340201) unless otherwise specified. Certain products contain coconut oil which requires a different sealing material. For these products use the coconut oil seal (Part # W0340210). The stationary half of the standard seal has a white polished surface. The stationary half of the coconut oil seal has a glossy black surface.

6. Remove carb tube from bottom of hopper and remove o-rings. (See Figure S).
7. Remove drip tray and empty contents.
8. Take all components to the cleaning area.
9. Prepare 1 gallon solution of hot tap water and a good grade of dishwashing detergent.
10. Thoroughly wash all components in a warm, mild detergent solution including the inside of the freezing cylinder and the mix storage hopper. DO NOT WASH COMPONENTS IN A DISHWASHER.
11. Use a medium sized brush to clean the bottom of the valve body and the inside of the plunger bore with detergent solution taking care to remove only remaining lubricant. (Figure T)
12. The exterior of the freezer should be cleaned as needed with a cloth towel.

⚠ **CAUTION: Coarse rags, abrasive cleaners and excessive force can damage and/or scratch the surfaces of the freezer.**

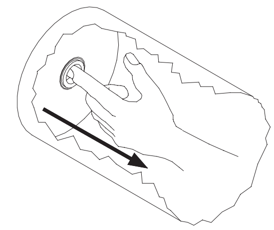


Figure R Installing the stationary half of seal

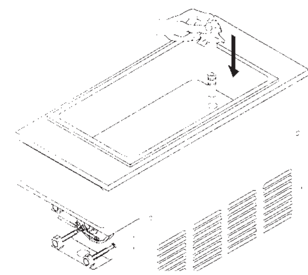


Figure S Carb Tube

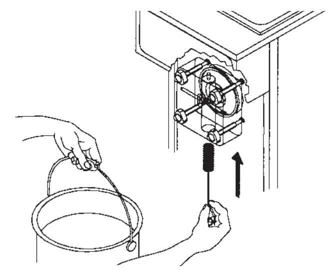


Figure T Clean Valve Body

Reassembly

NOTE: Allow all parts to dry completely before reassembly.

1. Reassemble drip tray and re-install on front of unit.
2. Wet the inner rubber lip of the rotary half of the seal and the back end of the dasher shaft with water. Slide rotary half of assembly onto the dasher shaft, RUBBER FIRST, with the smooth sealing surface facing the back of the dasher. (See Figure U). Be sure the rotary half is fully seated against the shoulder of the shaft.
3. Insert the stationary half of the seal into the ribbed rubber boot with the polished surface facing out (forward).
4. Lightly lubricate the ribbed rubber boot of the stationary ceramic seal (taking care not to get any lubricant on the polished surface) and insert it straight back into the recess at the back of the freezing cylinder, RUBBER FIRST. (See Figure V)

NOTE: The stationary half of the seal must be completely dry before reassembling. If the circular half of the seal is white, make sure that the grooved side is toward the rubber. If the circular half is black, be sure the glossy side is facing out.

5. Reassemble the dasher assembly, as shown in Figure W. Insert the larger front and smaller rear white plastic bearings into dasher, then slip in the stator rod. Attach scraper blades.
6. **Carefully and slowly guide the dasher into the freezing cylinder, taking care not to damage the seal assembly.** Turn dasher shaft until it engages the square drive coupling. Slide the dasher back into the cylinder so that the two smooth sealing surfaces meet. (See Figure X)
7. Inspect and lightly lubricate the large square o-ring and refit it into the back of the valve block assembly. Install the valve assembly on the front studs and tighten the knobs until they are finger tight. ***Do not use tools to tighten knobs.***

NOTE: Failure to lightly lubricate the large o-ring can result in product leakage.

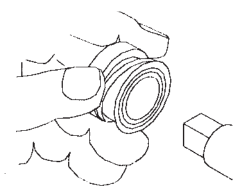


Figure U Re-assemble rotary half of seal as shown

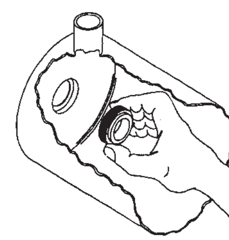


Figure V Installing the stationary half seal

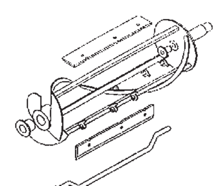


Figure W Dasher Assembly

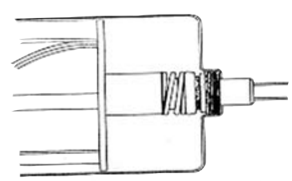


Figure X Seal Assembly

Sanitizing and Refilling

1. Reassemble carburetor by installing the two o-rings at the bottom of the carb tube.
2. Place the carburetor assembly in the bottom of the hopper.
3. Install the o-rings on valve plunger and lay plunger assembly on a clean piece of paper towel.
4. Prepare a minimum of 2.5 gallons (9.5 liters) of sanitizing solution (Kay-5 Sanitizer/Cleaner or equivalent) following the manufacturer's instructions.

NOTE: Add 1 ounce of Kay-5 to 2.5 gallons (9.5 liters) of 120°F (50°C) water to achieve a concentration of 100 parts per million.

5. Dip a medium sized brush into the sanitizing solution and sanitize the inside bore of the dispensing valve. (Figure Y)
6. Place a small amount of lubricant onto a piece of clean paper toweling. Use a clean piece of paper toweling to pick up the small end of the valve plunger assembly. Apply a thin film of lubricant from the other piece of paper toweling. (Figure Z)
7. Slide the valve plunger spring over the small end of the valve plunger and, using another clean piece of paper toweling, pick up the valve plunger at the outlet end and insert plunger and spring into the valve body. (Figure AA)
8. Push up on the valve plunger and insert the stainless steel handle. (Figure BB)
9. Holding the handle down slightly so that the hole in the handle and valve block are aligned, insert the dispensing valve handle retaining pin. (Figure CC)
10. Pour sanitizing solution into the mix storage hopper and allow the solution to fill freezing cylinder. Use a large brush to sanitize all hopper surfaces. (Figure DD)
11. Turn panel switch to "CLEAN" and allow freezer to run for 5 minutes.
12. Open dispensing valve and drain solution. Allow the dasher to push remaining sanitizer out of the freezing cylinder. Once the sanitizing solution is drained, turn panel switch to "OFF".
13. Place a small amount of sanitary lubricant onto another piece of clean paper toweling. Use a clean piece of paper toweling to pick up the large end of the carburetor from the bottom of the hopper taking care not to touch the sanitized carburetor with your bare hand (Figure EE). Apply the lubricant on the other piece of paper toweling to the two o-rings on the bottom of the carburetor assembly (Figure EE).
14. Place the lubricated carburetor assembly on a clean piece of paper toweling.
15. Prepare fresh product according to manufacturer's instructions.
16. Hold open the dispensing valve and pour product (approx. 10 oz.) into the hopper to allow this product to chase out any remaining sanitizer. Watch the product flowing out of the dispensing valve and close the valve when the new mix has purged the sanitizer remaining in the cylinder.
17. Use a clean piece of paper toweling to insert the sanitized carburetor assembly into the inlet hole in the hopper.
18. Fill mix storage hopper with fresh product. Cover hopper with hopper lid.
19. Turn front panel switch to "ON". Allow the freezer to reach proper consistency.

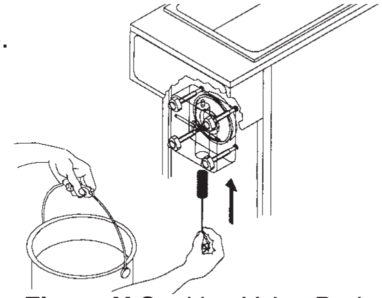


Figure Y Sanitize Valve Body

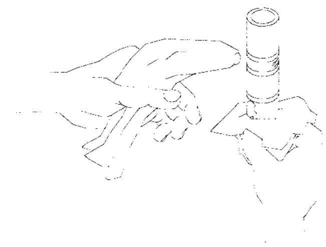


Figure Z Lubricate Plunger

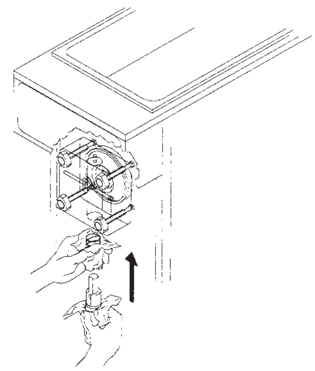


Figure AA Installing Plunger and Spring

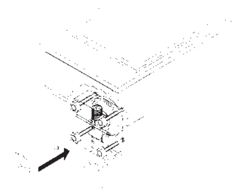


Figure BB Insert Valve Handle

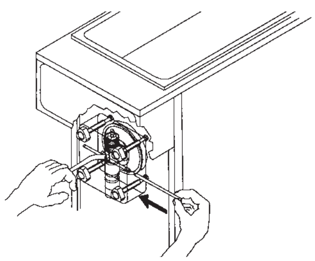


Figure CC Insert Retaining Pin

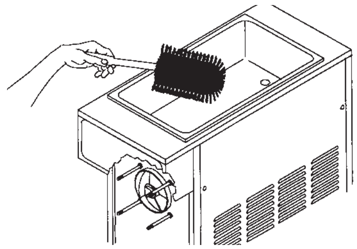


Figure DD Sanitize Hopper

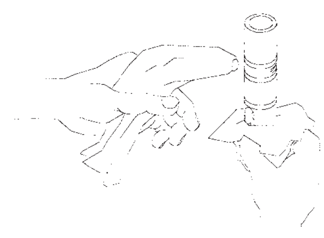


Figure EE Lubricate Carb Tube

Clean-In-Place Procedure (Daily Cleaning)
This equipment has been approved for a Clean-In-Place procedure that does not require complete disassembly on a daily basis. The unit still requires regular complete disassembly for cleaning and sanitizing. To perform the C-I-P procedure follow the instruction below:

1. Empty any product in the machine and turn to OFF.
2. Disassemble the dispensing valve assembly following the instructions in Disassembly and Cleaning.

NOTE: Leave the valve block in place. Only disassemble the plunger, handle, spring, o-rings and pin.

3. Remove carburetor assembly from hopper and remove o-rings.
4. Take all components to the cleaning area.
5. Carefully inspect the o-rings for cracks, chips or cuts and replace if necessary.
6. Prepare 1 gallon solution of hot tap water and a good grade of dishwashing detergent.
7. Thoroughly wash all parts including handle, pin, valve plunger, spring, carburetor assembly and all o-rings in detergent solution.
8. Use a medium sized brush to clean the bottom of the valve body and the inside of the plunger bore with detergent solution taking care to remove any remaining lubricant.
9. Reassemble following the instructions under Sanitizing and Refilling.

NOTE: Run the unit with sanitizer on “CLEAN” for 20 minutes before draining and refilling.

MAINTENANCE

WARNING: Disconnect power for maintenance. Do not attempt to perform maintenance on the freezer until electrical power has been disconnected.

Suggested Daily Maintenance
1. Clean, lubricate and sanitize the freezer following guidelines.
2. Clean the exterior of the freezer using a soft wet cloth. (Wipe down spinner if attached)
3. Empty drip tray.

Parts Replacement Schedule

Part Description	Monthly	Every 3 Months	Every 6 Months	Annually	Quantities to be Replaced
Shaft Seal (W0340201 or W0340210)				Replace	1
Drive Shaft (W0451067)				Inspect & replace if necessary	1
Drive Belts (W0450209)				Inspect & replace if necessary	1
Scraper blades on dasher (if equipped) (W1431084)			Replace		2
Square cut o-ring on valve body/face plate (W0340055)				Inspect & replace if necessary	1
Front stator flange bearing (W0430032)				Replace	1
Rear stator flange bearing (W0430024)				Replace	1
Dispense valve o-rings (W0340022)		Replace			Thick Product Plunger: 2 Standard Product Plunger: 3
Carb tube o-rings (W0340011)		Replace			2 or 3
Condenser	Inspect & clean if necessary (Air-cooled units only)				1

Refer to the Crathco Parts Price List when ordering the above parts

Preventative Maintenance Procedure (Every 6 to 12 Months)

A preventative maintenance visit should be performed every 6 to 12 months depending on the usage and environment where the unit is placed. (Ex. seasonal machines - once before season, year round machines - twice per year). The following procedures should be performed during a preventative maintenance visit. This does not take the place of daily care and cleaning procedures as described by local health codes and the manual. PM kit #W0890157 contains the standard replacement parts needed for preventative maintenance including o-rings, standard seal kit stator bearings and drive belt. Units with a coconut oil product seal should order all parts separately. Units with scraper blade dasher will require the scraper blades be ordered separately.

- Verify ventilation is adequate (Air-cooled units: 6" minimum on both sides, open at top, and as far as possible from dust sources; Water-cooled units: 0" on both sides, 3 - 6" at rear of unit and open at top).
- Verify adequate water flow and drain connections on water-cooled versions.
- Check product temperature and consistency for proper setting (refer to product manufacturer's recommendation) - adjust if necessary. Where equipped be sure to check the temperature in both the hopper and cylinder.
- Ensure product is being mixed properly and is within specification (check brix - most products should be around 13% - refer to product manufacturer's recommendations for exact recommended brix).
- Check for any leaks.
- Empty product from the unit. Disassemble unit completely (as if for cleaning).
- Clean and sanitize all disassembled parts following the cleaning instructions in the manual.
- Clean and sanitize hopper, freezing cylinder and splash zones on the machine.
- Check condition of all panels and lids - replace if necessary.
- Check dasher scraper blades for wear if equipped - replace once per year minimum.
- Check dasher for signs of wear - replace if necessary. Verify alignment when replacing.
- Check valve body gasket for wear - replace once per year minimum.
- Check valve body knobs (used to hold valve body in place) - replace if necessary.
- Check condition of shaft seals and stator bearings - replace once per year minimum.
- Inspect drip cup at back end of freezing cylinder for signs of seal leakage.
- Replace o-rings on hopper float (where necessary), dispense valves and carb tubes (lubricate).
- Lubricate parts where appropriate (dispense valve o-rings, carb tube o-rings, rubber boot of stationary shaft seal).
- Re-assemble unit and sanitize hopper and freezing cylinder by running CLEAN cycle.
- Clean and sanitize spinner if equipped.
- Check operation of merchandiser and mode lights - replace light bulbs if necessary.
- Clean reusable filter if equipped. Check condition of filter and replace if necessary.
- Clean condenser.
- Inspect the drive shaft and motor shaft bearings for excessive wear (drive shaft hole rounding out) - replace if necessary. Verify alignment when replacing.
- Check V-belt tension (should be 1/2" - 5/8") and verify all set screws are tightened - adjust if out of range. Replace belt once per year minimum.
- Verify compressor operation and freezer controller operation.
- Check electrical connections (outlet should be properly grounded with amperage capacity equal to or over the amperage specified on the serial tag).
- Check fan operation (condenser fan) and clean fan blades if necessary.
- Review proper periodic care and cleaning instructions (disassembly, cleaning, sanitizing, lubrication, and re-assembly) with store personnel. Train store personnel to follow proper procedures (stress importance of store level maintenance ie. lubrication, filter cleaning, etc.).
- Make sure store personnel have appropriate supplies (lubricant, cleaning brushes and sanitizer) to care for machine.

How to Clean Condenser (Air-Cooled Unit Only)

NOTE: Loss of refrigeration efficiency will result if condenser is allowed to become dirty. Excessive compressor run time or loss of capacity are a good indication that the condenser needs to be cleaned.

1. **Disconnect electrical power.**
2. **Remove** side panels.
3. **Place a damp towel over the side of the condenser opposite the fan motor.**
4. Use compressed air or CO_2 blow out dirt from the fan side of the condenser. An alternate cleaning method is to use a condenser brush and vacuum cleaner.

⚠ **CAUTION:** Procedure can create a loud noise.

How to Clean Exposed Filter (Air-Cooled Unit Only)

1. Slide exposed filter out of the rails by pulling forward on the filter. It is recommended to remove the filter by using the palm of your hand and applying even pressure to the face of the filter.
2. Clean filter with liquid soap and water.
3. Soak filter for 15 minutes.
4. Rinse filter with heavy stream of water, opposite the direction of air flow. Allow filter to dry.
5. Slide the filter into the rails until the filter contacts the stop on the top rail.

How to Clean Concealed Filter (Air-Cooled Unit Only)

1. For concealed filters lift lid and pull up on filter tab to remove filter.
2. Clean filter with liquid soap and water.
3. Soak filter for 15 minutes.
4. Rinse filter with heavy stream of water, opposite the direction of air flow. Allow filter to dry.
5. Slide filter into top of filter cover with removal clip up and the air flow arrows facing the existing panel.

How to Adjust Belt

⚠ **CAUTION: Unplug the machine before performing any adjustments. This procedure must be done by a qualified technician.**

Check the belt tension. The proper belt deflection is 1/2” over all. If the deflection is more than 1/2” the motor will need to be lowered. If the deflection is less than 1/2”, the motor will need to be raised. Follow this procedure to adjust the motor to achieve proper belt tension. (See Figure FF)

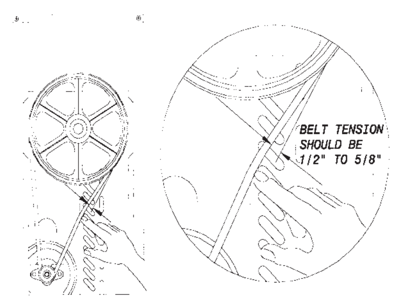


Figure FF

1. Unplug the machine and remove both side and rear panels.
2. Locate the motor flange bearings. These are the side mounted bearings that hold the motor to the cradle. The motor is double shafted and the shaft extends through a bearing on each end. The bearing is held to the motor cradle by two allen bolts on each bearing.
3. Loosen the allen bolts on each bearing. Do not loosen the setscrews that hold the bearing collar to the motor shaft.
4. Lower the motor or raise the motor as needed. The motor must be kept level from front to back. Do not lower or raise only one end of the motor. This will result in excessive belt wear and belt noise.
5. Tighten all four allen bolts down. Align the motor pulley with the top pulley if needed.
6. The motor pulley should be in alignment with the large (driven) top pulley. Use a straight edge along the top pulley.
7. If the pulleys are not in alignment, loosen the setscrew on the motor pulley and move either in or out as needed.
8. Tighten the setscrew back down on the motor shaft (use of non-permanent loc-tite is recommended). Please be sure the setscrew is tightened down on the flat surface of the motor shaft.
9. Return the unit back to service.

How to Change Back Lit Sign Merchandiser Bulb

1. Remove the two screws, located on the top of either side of the sign.
2. Lower the metal enclosure that frames the merchandiser insert.
3. Pull merchandiser enclosure down and out.
4. Replace bulb inside.
5. Reassemble. For ease of assembly, put merchandiser in light box before placing metal enclosure back on.

GENERAL TROUBLESHOOTING

Freezer problems originate from three sources - improper operation, mix problems or mechanical malfunction. *Always check for improper operation and mix problems first, as they are the most common cause of most equipment problems.*

⚠ **CAUTION:** Always disconnect power before attempting any maintenance procedures.

Only a qualified service technician should perform electrical and mechanical adjustments or repairs.

PROBLEM	PROBABLE CAUSE	REMEDY
Machine will not run or freeze down	• Machine not plugged in • Circuit breaker tripped or fuse blown • Machine in CLEAN or OFF position • Obstructed condenser air flow (Air-cooled units) • Compressor not operating • Dasher not installed • Low refrigerant charge	• Plug machine in • Reset breaker or replace fuse • Switch to ON position • Clean condenser. Allow 6" (15 cm) on both sides • Check for cause and correct • Install dasher (auger) • Check for leaks, repair and recharge
Product too soft	• Consistency setting too loose • Consistency setting at maximum (red spring) • Product BRIX level too high • Too much alcohol in mix	• Readjust consistency control • Change to yellow consistency spring • Lower liquid product BRIX level • Lower alcohol content
Product too stiff	• Consistency adjuster set too firm • Product BRIX level too low	• Readjust consistency setting or change to red spring • Increase product BRIX level
Product will not dispense	• Power switch OFF • Inadequate mix in hopper. Red MIX LOW light on • Consistency adjuster set too firm • Carburetor inlet hole clogged • Drive belt broken or off pulley • Drive shaft worn • Drive motor failure	• Turn power switch ON • Refill hopper • Readjust consistency setting • Unclog carburetor inlet hole • Repair or replace • Inspect square drive shaft pocket for excessive wear, replace • Replace motor
Leakage from drain tube, front of freezer above drip tray	• Worn or defective shaft seal • Seal installed incorrectly	• Replace seal and then lubricate at each cleaning • Remove and install seal
Excessive Dispensing Valve Leaks	• Worn or defective o-ring(s)	• Replace and lubricate
Clicking sound from inside machine	• Low voltage • Extension cord is used	• Use dedicated circuit with proper rating • Connect directly to power source or use power cord of proper size
Thumping sound from inside machine	• Worn belt	• Replace belt
Scraping sound during freeze down	• Frozen product scraping off of cylinder walls • No product in machine	• Sound should go away when product is frozen to proper consistency • Fill with product
Premature seal wear	• Incorrect installation of dasher • Improper drive shaft clearance • Incorrect shaft alignment	• Advise careful installation • Adjust to proper • Align shaft
Merchandiser light flickers when freezer cycles	• Low voltage	• Connect freezer to dedicated circuit with proper rating

If you still need help, call our Service Department at (800) 695-4500 (Monday through Friday 8am - 6pm EST) or an authorized service center in your area. Please have the model and serial number ready so that accurate information may be given. Prior authorization must be obtained from Grindmaster's Technical Services Department for all warranty claims.

CHECK LIST

PARTS IDENTIFICATION

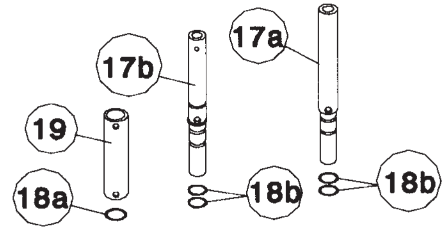
Do not cover ventilation grill on sides of machine.
Read equipment instructions before handling parts.

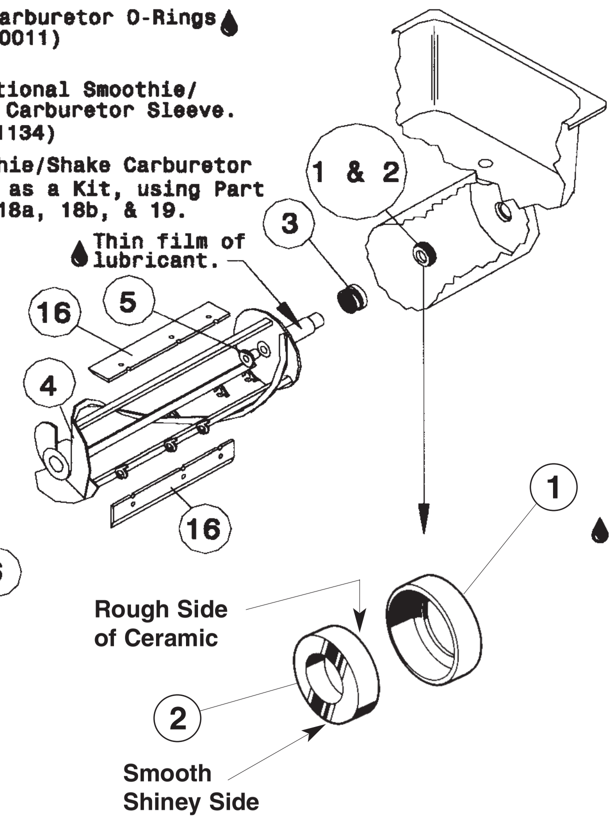
- [ ] 1 Stationary Seal Rubber Part 💧
- [ ] 2 Stationary Seal Ring
- [ ] 3 Spring Seal

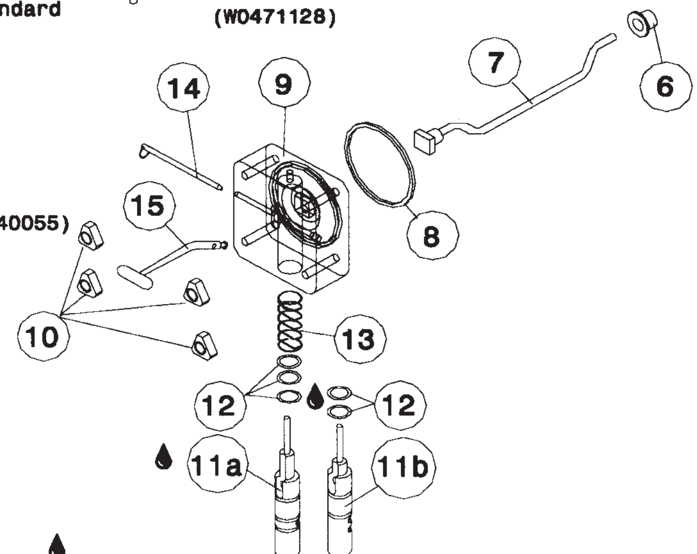
Coconut Oil Seal (W0340210) and Standard Seal (W0340201) include 1,2, & 3.

- [ ] 4 Dasher (W0430026)
  Scraper Blade Dasher (W0430089)
- [ ] 5 Plastic Rear Bearing (W0430024)
- [ ] 6 Plastic Front Bearing Standard (W0430032)
- [ ] 7 Stator Rod (W0430028)
- [ ] 8 Face Plate Quad Ring (W0340055)
- [ ] 9 Valve Body (W0480450)
- [ ] 10 Valve Knobs (W0630711)
- [ ] 11a Slush Plunger (W0480438)
- [ ] 11b Thick Product Plunger (W0480451) 💧
- [ ] 12 Plunger O-Rings (W0340022) 💧
- [ ] 13 Plunger Spring (W0631230)
- [ ] 14 Valve Pin (W0611728)
- [ ] 15 Valve Handle (W0480445)
- [ ] 16 Scraper Blade (W1431084)
  Use with scraper blade dasher
- [ ] 17a Standard Carburetor (W0471076)
- [ ] 17b Optional Smoothie/ Shake Carburetor. (W0471128)
- [ ] 18a Sleeve O'Ring 💧 (W0340012)
- [ ] 18b Carburetor O-Rings 💧 (W0340011)
- [ ] 19 Optional Smoothie/ Shake Carburetor Sleeve. (W0471134)

Optional Smoothie/Shake Carburetor comes together as a Kit, using Part numbers, 17b, 18a, 18b, & 19.





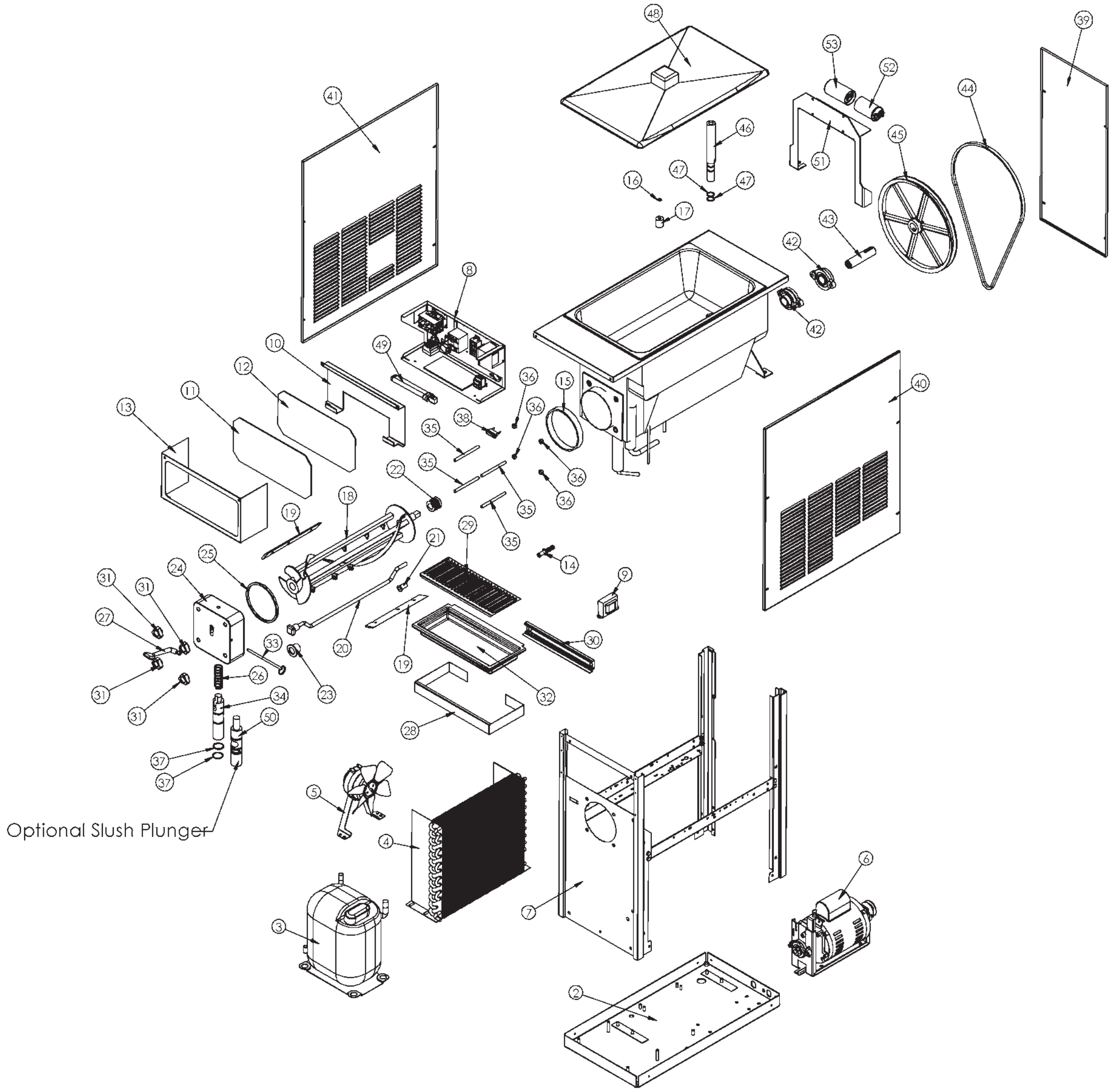


Add o-rings to plunger first, then lubricate plunger and o-rings. 💧

💧 = Lubricate

Assemble first, lubricate, then insert into freezing cylinder.

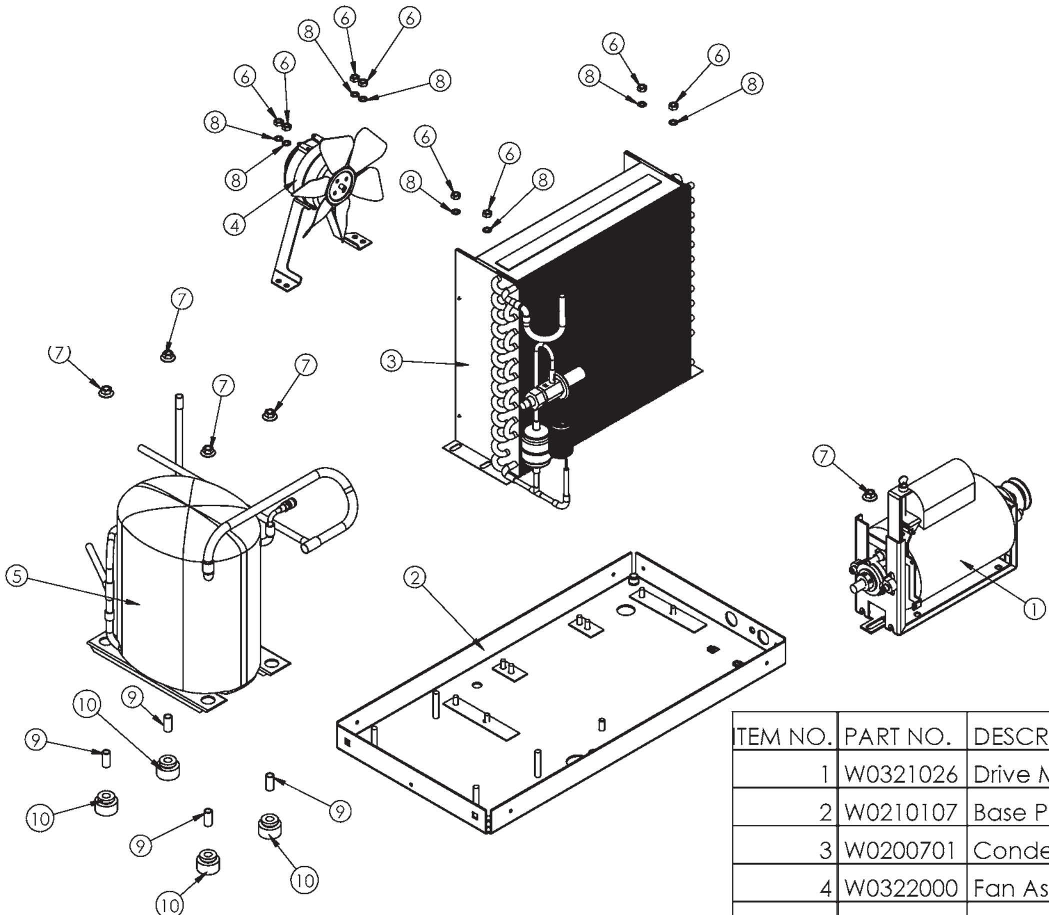
Exploded View
Model 3511



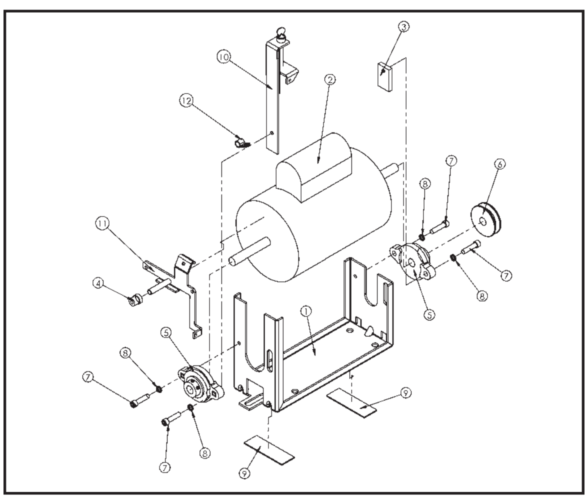
ITEM NO.	PART NO.	DESCRIPTION
1	W0201272	Cylinder Assembly
2	W0210106	Base Pan Assembly
3	100740	1 HP Compressor, 230V
4	W0200256	Condenser Coil, Air, CFB
5	W0322000	Fan Assy, 220/60
6	W0321026	Drive Motor Assembly
7	W0210083	Frame Assembly
8	W0572247	Electrical Box Assembly
9	W0570047	Ballast
10	W0572290	Light Reflector
11	W0631610	Front Display Lens
12	W0631614	Acrylic Lens
13	W0572452	Electrical Box Cover
14	W0211112	Drain Tube Fitting
15	W0340058	Barrell Gasket
16	W0340007	#108 Float O-Ring
17	W0570941	Mix Low Indicator Float
18	W0430089	Dasher Weldment, Scraper
19	W1431084	Scraper Blade, New Style
20	W0430029	Stator Rod
21	W0430024	Rear Stator Bearing
22	W0340201	Shaft Seal Set
23	W0430032	Stator Flange Bearing
24	W0480450	Valve Body
25	W0340055	Valve Square Cut O-Ring
26	W0631230	Valve Spring
27	W0480445	Valve Handle

ITEM NO.	PART NO.	DESCRIPTION
28	W0472062	Pan, Drip Form X-LG
29	W0472063	Insert, Drip Pan X-LG
30	W0472064	Drip Pan Bracket
31	W0630711	Valve Knob
32	W0631632	Drip Tray
33	W0611728	FasPin, Valve
34	W0480451	Thick Product Plunger
35	W0110013	Valve Studs
36	W0611085	Nut, 5/16-18 S.S. Hex Nut
37	W0340022	Plunger O-Rings
38	W0570018	Light, Indicator LT Red 12V
39	W0520063	Rear Machine Panel
40	W0520065	Right Side Panel
41	W0520107	Left Side Panel
42	W0380025	Bearing, 1" Bore
43	W0451067	Driveshaft, Slush
44	W0450209	Belt, V
45	W0450053	Pulley, 10"
46	W0471075	Carb Tube, Slush/Cocktail
47	W0340011	O-Ring, -115 Buna-N Carb Tube
48	W0520094	Hopper Cover
49	W0570043	Bulb, Fluoresent
50	W0480438	Slush Plunger, Standard
51	W0572511	Bracket, Capacitor Support
52	W0570617	Run Capacitor
53	W0570619	Start Capacitor

Model 3511
Base Assembly



ITEM NO.	PART NO.	DESCRIPTION
1	W0321026	Drive Motor Assembly
2	W0210107	Base Pan Assembly
3	W0200701	Condenser Assembly
4	W0322000	Fan Assembly 220/60
5	W0200703	Copeland Compressor Sub-Assy.
6	W0611074	Nut, Hex, 1/4-20, Z/P
7	W0611082	NUT, 5/16-18 FLANGE, LARGE
8	W0611247	1/4" Int. Tooth Lockwasher
9	W0200412	Spacer,Compressor
10	W0200413	Compressor Mount Grommet

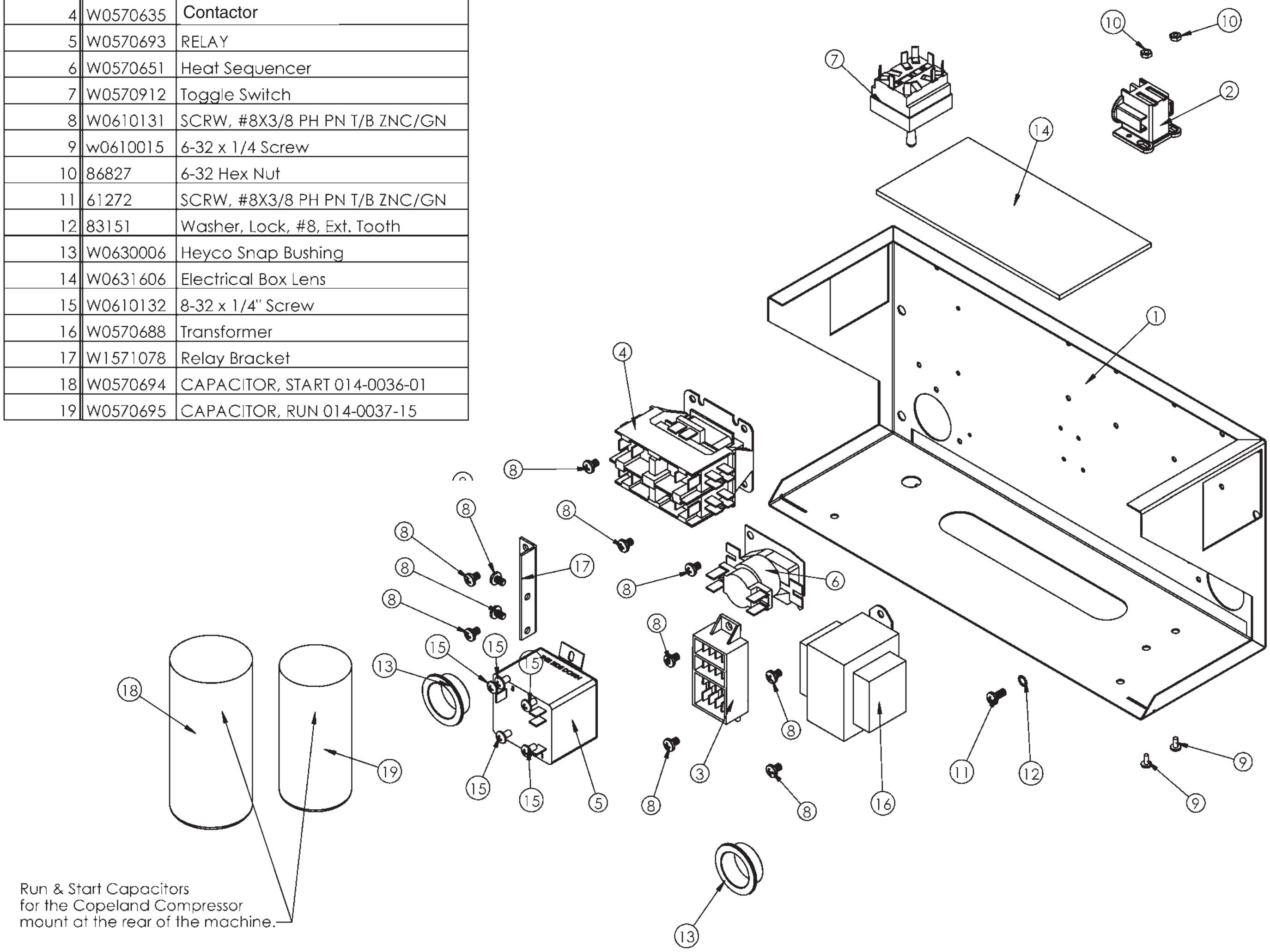


Drive Motor Assembly (See figure on left)

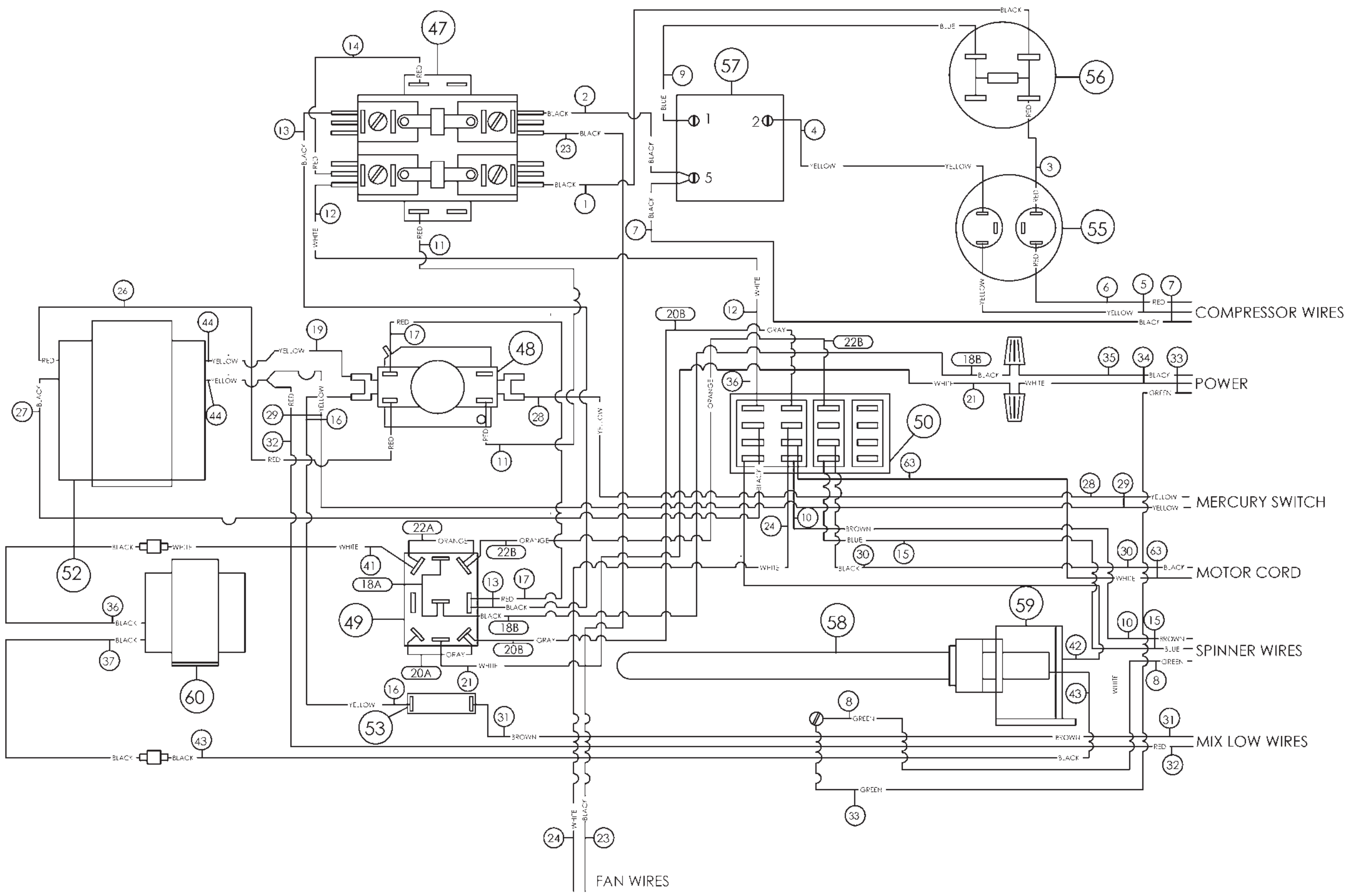
ITEM	PART NUMBER	DESCRIPTION	ITEM	PART NUMBER	DESCRIPTION
1	W0210169	Motor Cradle	7	W0610559	Bolt for Bearing
2	W0320020	Motor, Drive Dual Cycle 1/2HP	8	W0611249	Washer, Split, Lock, Z/P
3	W0321013	Nut, Motor Adjustment	9	W0671022	Insulation, Motor Brkt Sound
4	W0321027	Pin Sleeve	10	W0170014	Consistency Control
5	W0380009	1" Bore Flange Bearing	11	W0321025	Motor Stop Brkt Assy
6	W0450016	Pulley, 0K7 x 1/2" Browning	12	W0630421	Cable Clamp

Model 3511
Electrical Box Assembly

ITEM NO.	PART NO.	DESCRIPTION
1	W0572287	Electrical Box
2	W0570044	SOCKET,LIGHT-LEVITON
3	W0570235	Terminal Block, 4 Circuit
4	W0570635	Contactor
5	W0570693	RELAY
6	W0570651	Heat Sequencer
7	W0570912	Toggle Switch
8	W0610131	SCRW, #8X3/8 PH PN T/B ZNC/GN
9	w0610015	6-32 x 1/4 Screw
10	86827	6-32 Hex Nut
11	61272	SCRW, #8X3/8 PH PN T/B ZNC/GN
12	83151	Washer, Lock, #8, Ext. Tooth
13	W0630006	Heyco Snap Bushing
14	W0631606	Electrical Box Lens
15	W0610132	8-32 x 1/4" Screw
16	W0570688	Transformer
17	W1571078	Relay Bracket
18	W0570694	CAPACITOR, START 014-0036-01
19	W0570695	CAPACITOR, RUN 014-0037-15

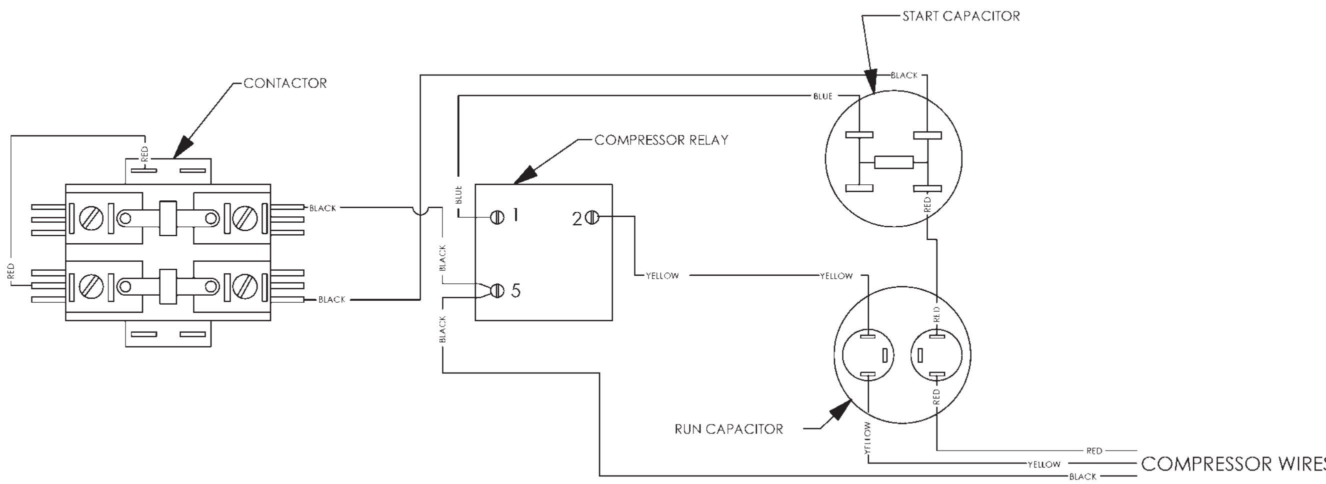


Model 3511
Wiring Diagram

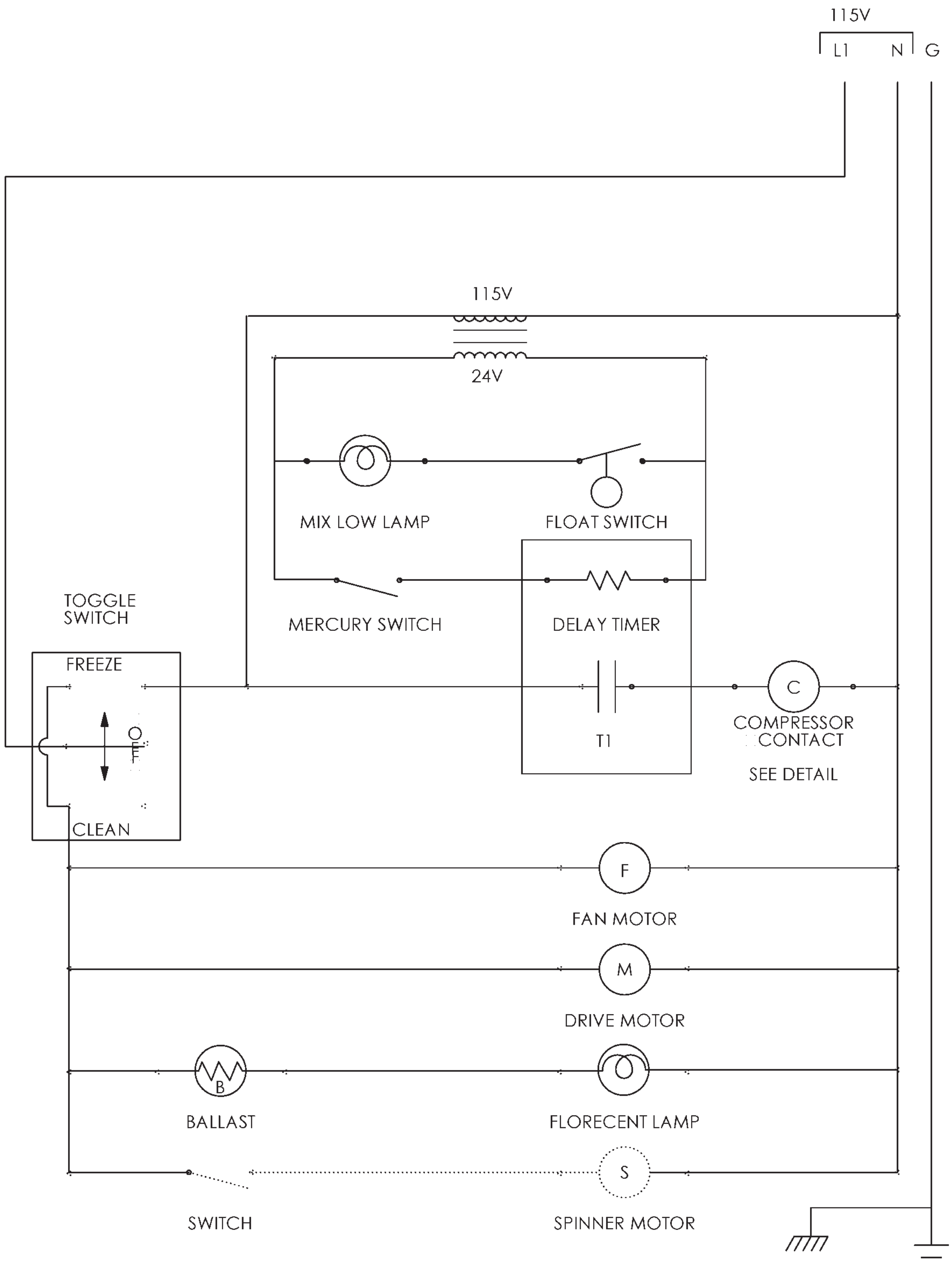


ITEM	PART NUMBER	DESCRIPTION
47	W0570635	CONTACTOR
48	W0570651	SEQUENCER
49	W0570912	TOGGLE SWITCH
50	W0570235	TERMINAL BLOCK
52	W0570688	TRANSFORMER
53	W0570018	INDICATOR LIGHT
55	W0570617	RUN CAPACITOR
56	W0570619	START CAPACITOR
57	W0570618	COMPRESSOR RELAY
58	W0570043	FLORECENT LIGHT
59	W0570044	LIGHT SOCKET
60	W0570047	BALLAST

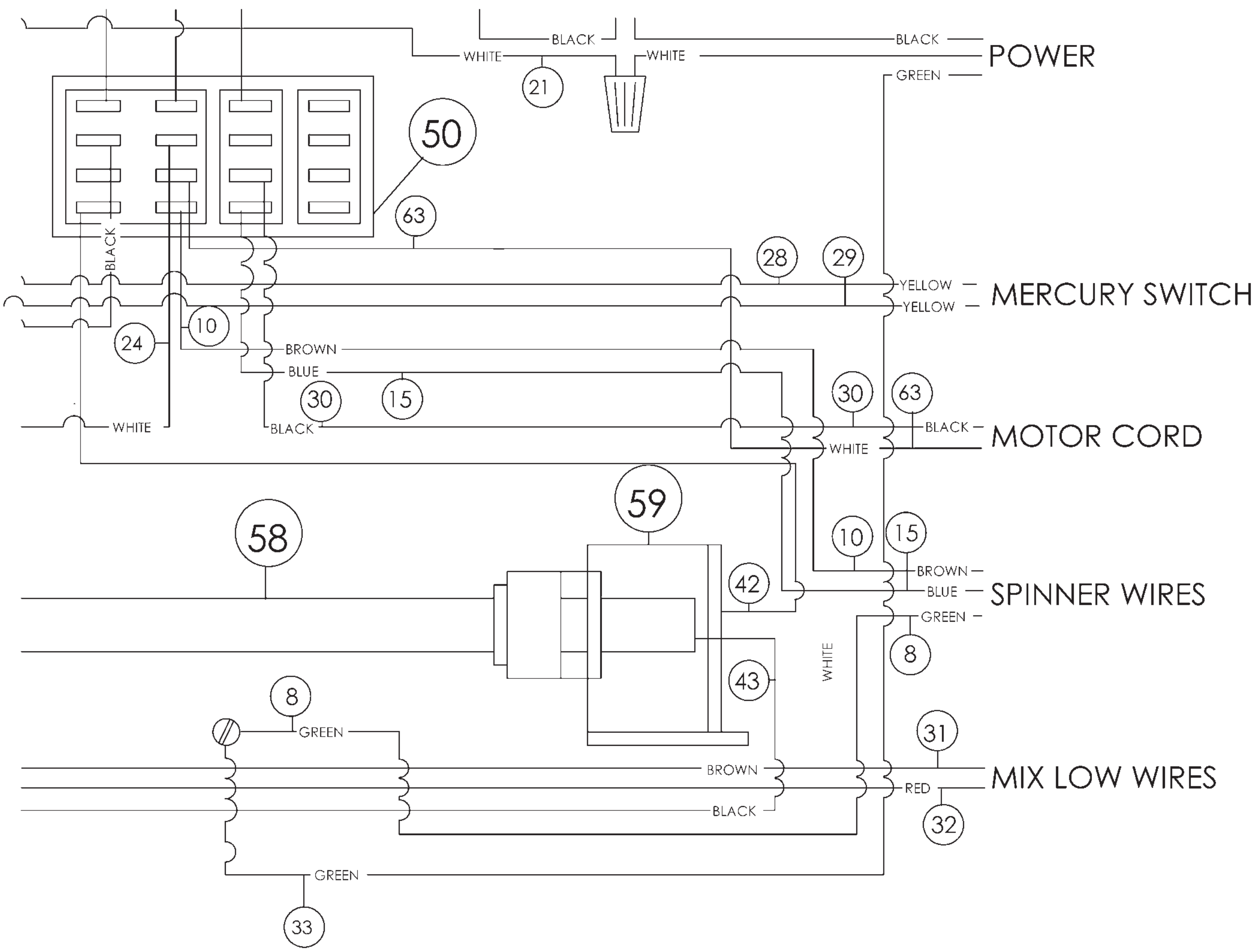
Model 3511
Compressor Wiring



Model 3511
Ladder Diagram

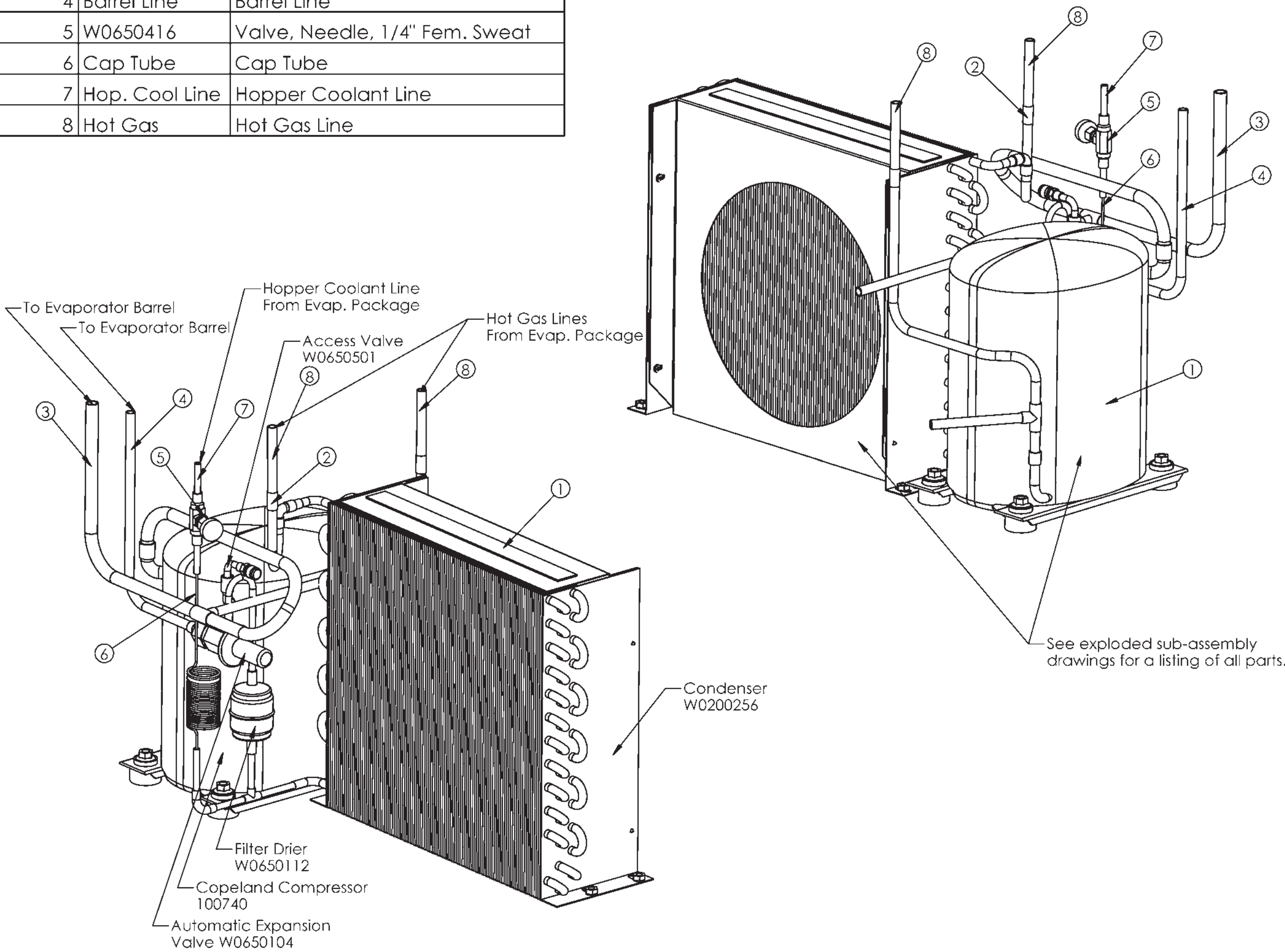


Model 3511
Spinner Wiring

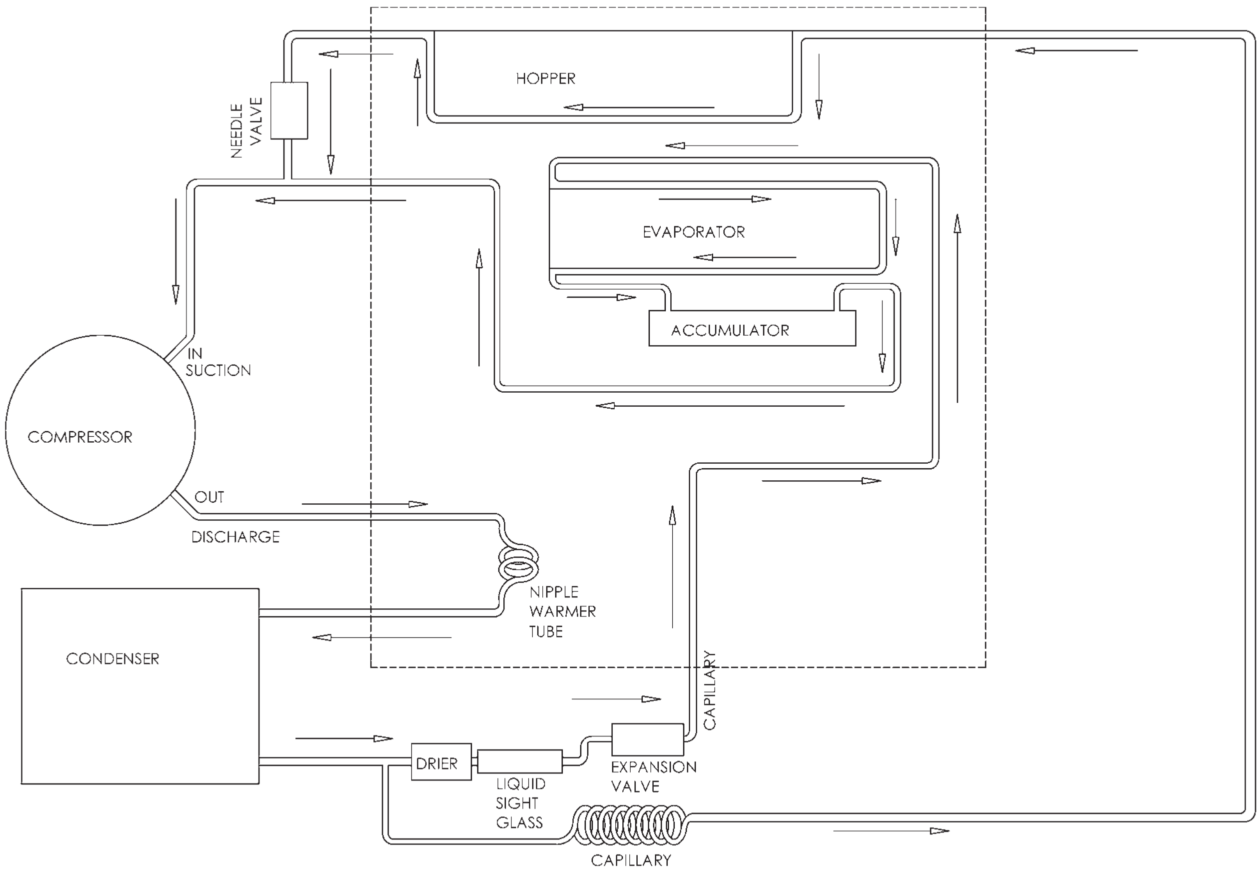


Model 3511
Refrigeration

ITEM NO.	PART NO.	DESCRIPTION
1	W0201261	Base Assembly
2	W0620103	COUPLING, 3/8" ODS
3	Ref Suct. Line	Ref. Suct. Line
4	Barrel Line	Barrel Line
5	W0650416	Valve, Needle, 1/4" Fem. Sweat
6	Cap Tube	Cap Tube
7	Hop. Cool Line	Hopper Coolant Line
8	Hot Gas	Hot Gas Line



Model 3511
Refrigeration Schematic



GRINDMASTER™
CORPORATION

Grindmaster® Coffee Grinders and Brewers • Espressimo® Espresso Machines • Crathco® Hot Beverage Dispensers
Crathco® Cold and Frozen Beverage Dispensers • American Metal Ware® Coffee and Tea Systems
Tel (502) 425-4776 • Fax (502) 425-4664 • 1-800-695-4500
P.O. Box 35020 • Louisville, KY 40232 • USA
www.grindmaster.com • email: info@grindmaster.com

0804 Form # WH-305-02
Part # W0600114